Ambivalence, resource constraints, and non-compliance; the bane of healthcare providers in the screening and management of Gestational Diabetes in Northern Ghana

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Abstract

Background

Studies on healthcare providers' experiences on screening and management of GDM are rare in the northern part of Ghana. Hence, this study sought to explore the experiences of healthcare providers on screening and management of GDM.

Materials and methods

This was a qualitative cross-sectional study among five key informants who were involved in screening and management of GDM. Both facilities and key informants were purposively sampled. An interview guide was designed to elicit information on gestational diabetes screening and management experiences. Data were analysed using thematic content analysis.

Results

Two themes emerged for both screening and management experiences; the screening experiences were resource-related experiences which comprised of financial constraints, lack/inadequate tools for screening and insufficient number of dedicated healthcare personnel and experiences with patient emotional feedback which were clients being worried, shocked, confused, uncertain about how they felt or unbothered based on their knowledge of GDM, being fed-up with treatment, and lack of support from family members. The themes for management were diet and exercise, and oral medications. HCPs experience issues of non-compliance which were mainly caused by poverty, they also felt that the most important resources required for the effective screening and management of GDM were the tools for screening and dedicated staff. The first line of action for GDM management was diet and exercise, oral medications was the last line of action.

Conclusion

This study observed that ambivalence of clients, resource constraints namely financial constraints, lack/inadequate tools for screening and inadequate number of healthcare providers were key issues in the screening and management of Gestational Diabetes; diet and exercise, and oral medications were the main approaches for the management of Gestational Diabetes. This study provides insights on healthcare providers’ experiences with screening and management of GDM which could be relevant for health advocacy and social and behavior change communication. It could also be relevant for health planning and policies as it provides insights on the resources needed to effectively screen and management GDM.
Introduction

Better maternal and fetal health outcomes come from managing Gestational Diabetes Mellitus (GDM) during pregnancy [1, 2]. According to Garrison, monitoring blood sugar levels and making lifestyle changes are part of the initial management; pharmacologic therapy including using metformin, glyburide, or insulin should start if blood glucose levels continue to be above therapeutic levels [3]. Another study demonstrated that physicians initially try to lower blood sugar levels by altering diet and encouraging clients to exercise, and only resort to using insulin if those methods failed [4]. The American Diabetes Association’s standards of medical care in diabetes also recommends that when medical nutrition therapy, exercise, and glucose monitoring are ineffective at maintaining a normal blood glucose level, insulin may be given as a last resort [5].

In a study, Sahu and colleagues found a number of obstacles that women who had been screened and given a diagnosis of GDM faced in managing the condition properly. The limited information given to expectant mothers and the healthcare providers’ (HCPs) failure to emphasize the significance of prompt and effective management were two of them, they also stated that HCPs experienced stress as a result of the heavy workloads and overcrowding in public hospitals, additionally, insufficient supplies, lack of equipment, and a lack of reagents, among other operational challenges, also significantly affect GDM management services [6].

Timm and colleagues suggests that because women with GDM engage with several types of HCPs, each of whom has a unique professional identity, strong coordination amongst HCPs is necessary to ensure a cogent treatment pathway and concluded that establishing a cogent treatment pathway for women with present and past GDM is difficult and is hampered by hurdles [7]. Another study noted that health messages should be customized to the health beliefs and be succinct and direct in order to encourage behavior change [8]. In the same light, a different study suggested that GDM self-management information should be given in a way that enables pregnant women to continue eating traditionally; giving advice on culturally appropriate lifestyle changes for self-management will ease the burden on medical professionals and reduce the need for recurring hospital stays and insulin use [9].

In Ghana, nursing management of gestational diabetes mellitus was the subject of a study by Mensah and colleagues. They came to the conclusion that supporting women who have been diagnosed with GDM, educating women and nurse-midwives about the condition, and enlisting the help of close family and friends were all essential components of nursing management of GDM [10]. Studies on healthcare providers’ experiences on screening and management of GDM are rare in the northern part of Ghana and the few studies available have focused on other quantitative aspects of gestational diabetes at the expense of healthcare providers’ experiences on screening and management of gestational diabetes in northern Ghana. Hence, this study sought to explore the experiences of healthcare providers on the screening and management of GDM

Methods
Study Area

The study was conducted in Tamale, the capital of the old Northern region of Ghana with a population of 2,479,461, in health facilities in the Tamale metropolis. Four major health facilities within the metropolis were selected. The Ghanaian health system is a three-tiered system namely primary, secondary and tertiary care; three of the facilities sampled in this study were from the secondary level (Tamale Central Hospital (TCH), Tamale West Hospital (TWH) and SDA Hospital) and one was from the tertiary level Tamale Teaching Hospital (TTH). According to the 2010 population census, the total fertility rate of the Tamale metropolis is 2.8, the crude birth rate is 21.2/1000, and the general fertility rate is 79.9/1000 among women aged 15–49 years [11].

Study Population

The study population comprised of healthcare providers involved in the management of gestational diabetes.

Study design, sampling and sampling techniques

The study was a qualitative cross-sectional design in which experiences of healthcare providers were assessed. Sample size was on the basis of data saturation and after five healthcare providers were interviewed as key informants, data saturation was attained, these study participants were sampled purposively from four major health facilities, which were also sampled purposively, within the northern region of Ghana. All the facilities selected had Antenatal care (ANC) setups which were made up of nutritionists, nurses, midwives, medical officers and a laboratory attached to the ANC. Only healthcare providers working in the selected facilities and were involved in the screening and management of GDM were included in the study. Facility heads or officers in charge of the various facilities were initially interviewed to identify key informants or asked to recommend individuals they deemed to be well versed in the screening and management of GDM within their respective facilities.

Data Collection

Data were obtained through face-to-face key-informant interviews. Interview guides were designed to elicit information on experiences on screening and management of gestational diabetes. Experiences, on how pregnant woman felt about being diagnosed with gestational diabetes, the screening process, and their roles as healthcare providers particularly on management of GDM as well as the challenges they experience, were measured by adapting items previously used by Sahu et al [6] for healthcare providers. All the methods used in this study were in accordance with relevant guidelines and regulations.

Data analysis

Data were approached from a realist/essentialist paradigm. The data were analysed at the semantic level using Braun and Clarke’s six-steps for thematic analysis after key-informant interviews were transcribed.
verbatim; we, went over the data repeatedly to be familiar with it, then generated initial codes for the data and subsequently identified themes, these themes were reviewed and explained [12].

**Results**

**Experiences of healthcare providers (HCPs) on the screening and management of GDM.**

The total number of HCPs interviewed were five, the minimum educational qualification for the study participants was a diploma and the highest were specialization of medical officer and a master’s degree by a nutritionists. Their ages ranged from 28 to 44 years old (See Table 1).

<table>
<thead>
<tr>
<th>Age</th>
<th>Designation</th>
<th>Qualification</th>
<th>Experience in years</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>Staff Nurse</td>
<td>Diploma</td>
<td>5–10</td>
</tr>
<tr>
<td>28</td>
<td>Midwifery officer</td>
<td>BSc Midwifery</td>
<td>3–5</td>
</tr>
<tr>
<td>34</td>
<td>Obstetrician</td>
<td>MBBS, OBG</td>
<td>5–10</td>
</tr>
<tr>
<td>33</td>
<td>Dietician/Nutritionist</td>
<td>Bsc Community Nutrition, Mphil Dietetics</td>
<td>10–15</td>
</tr>
<tr>
<td>44</td>
<td>Senior Midwifery officer</td>
<td>Degree</td>
<td>15–20</td>
</tr>
</tbody>
</table>

**How Does It Start?**

All the health care providers interviewed indicated that screening is performed by midwives at ANC and in some cases by laboratory technicians. The obstetrician outlined that during ANC, medical history is taken, there is physical examination and some laboratory tests are requested from laboratories; midwives do vital signs and take protein and glucose in urine test. Screening for gestational diabetes is done on days specifically designated for screening, screening and diagnosis is usually after 20 weeks of gestation, women are counselled before screening and after screening, positive cases are usually counselled and referred to diabetic clinics or obstetrics and gynaecology unit. GDM is best diagnosed around 24–28 weeks of pregnancy after three consecutive test. The explanation below is what one health care provider had to give;

“From the history, physical examination and laboratory test, particularly history, if we find anything unusual then we are more embolden to perform further test” (# Gynaecologist)

One other healthcare provider said “women usually undergo several test; urine (rapid) test and positive cases are referred for further test which include fasting blood glucose test and/or glycated haemoglobin (HBA1c) test.” (# Gynaecologist)
She further suggested that “elsewhere, all women get OGGTT but it is not done here because of cost. So we do a history first and then when we find risk factors, we ask them to do OGGTT. So the screening help to identify those who are at risk of GDM” (# Gynaecologist).

“We pick up certain risk factors; person’s weight, previous history of GDM, current history of diabetes, stillbirth and any foetal anomalies in previous pregnancy are looked at.” (# Gynaecologist)

One of them added that on clinic days, test and screening is free as a result of free maternal care policy and health insurance, payment is for HBA1c test only and when patients come on days other than the clinic days. Another added that urine test is usually free but random glucose cost Ghana cedis (Ghc) 5.

“One on clinic days test and screening is free as a result of free maternal care policy and health insurance. Payment is for HBA1c test only and when patients come on days other than the clinic days” (# Nutritionist/Dietician)

“Urine test is usually free but random glucose cost Ghc 5 which is used to buy test strips” (# Midwife)

**What Happens After Screening?**

After screening, depending on the results of urine test/ random blood glucose, patients are referred to the doctor, patients are referred to dieticians/nutritionist when there is a nutrition-related problem, referral is not done immediately, and sometimes diagnosis has to be confirmed before management begins. Diet history is taken and sometimes hormonal profiles are requested before dietary counselling is initiated. During ANC, there are general talks or education on some topics especially nutrition related topics (GDM included) organized by nurses and midwives.

“Patients who can afford glucometers are asked to buy and monitor blood glucose regularly and report to dietician or nutrition (test should be at least two times daily)” (# Nutritionisit/Dietician)

**Roles Various Hcp Plays**

Midwives conduct screening or tests on patients and explain the rational for the test and patients are referred to the nutritionist or doctor. Dietician or nutritionist is only involved when there is a problem or when GDM is suspected. The obstetrician said “I offer ANC services, aside vital signs, all the other things I have mentioned are assessed by me” (# Gynaecologist)

The dietician said “cases are monitored and counselled, due to work load follow up is usually a challenge” (# Nutritionisit/Dietician)

**Importance Of Screening To A Doctor**
All the study participants suggested that screening for GDM is a useful step to undertake as it helps identify women at risk of developing GDM and also eliminates guess work.

One of them said “screening help us pick those who are likely to get GDM and perform further test” (# Midwife)

**Challenges Hcp’s Faced When Screening Women For Gdm**

All the healthcare providers conceded that they face some challenges in screening for GDM. The challenges they face during screen for GDM include:

- Tools for screening not readily available (Inadequate test strips)
- Women not been co-operative
- Workload makes follow-up difficult
- Cost of further screening (confirmatory test) problematic

“Women sometimes come in at a time when laboratory service run test have closed. Cost is another challenge, OGTT is not covered by health insurance and women have to pay for it, sometimes you request for it this week and the woman would bring it 2–3 weeks later.” (# Gynaecologist)

**Feelings/emotions/concerns Of Women And Her Family Expressed After Learning The Gdm Status**

On the feelings/emotions expressed by women and their families after learning of GDM, the healthcare providers said women were usually worried, shocked, confused or uncertain about how they felt and others were not bothered.

“Well, it depends on the person’s appreciation of what the condition is, because for some, they really don’t understand, so they are not perturbed but those who have an understanding that this disease can affect every other part of their bodies—they tend to be quite worried, worried about the growing baby and themselves and then their future even after having the baby.” (# Gynaecologist)

**Treatment Women With Gdm Receive**

The treatment for GDM usually begins with counselling, women are counseled on the disease and diet and encouraged to exercise. Oral medications, specifically metformin and insulin are usually the last line of action when managing or treating GDM. Below are excerpts of some participants;

“Dietary interventions are used and if there is no dietician, the patient is placed on medications” (# Nutritionist/Dietician)
“We usually go through counselling for them to understand the disease they have. We also do dietary counselling to modulate food for them and help them to identify foods that are of high glycaemic index and they don't have to take them. We also encourage them to exercise.” (# Gynaecologist)

“We use oral medications; in pregnancy metformin is good and when we are not able to control enough, we add insulin” (# Gynaecologist)

**Who Guide Women About The Treatment Procedures/ Management Of Gdm?**

According to the study participants, the healthcare providers involved in the guidance on treatment or management of GDM include dieticians, nurses, doctors and laboratory personnel.

One of the healthcare providers specified that “Doctors mostly prescribed and its administered by midwives.” (# Nurse)

Another added that “Doctor and dietician” (# Gynaecologist).

Another also offered that “Dieticians, Nurses, Doctors, Laboratory personnel” (# Nutritionist/Dietician)

**Challenges Women Face In The Management Of Gdm And How It Affect Hcps**

All the healthcare providers admitted that women also face challenges in the management of GDM. The challenges include; long waiting queues at laboratories, when women are stressed they abscond, inadequate support from family members or relatives leading to emotional trauma and anxiety, financial challenges and medications not being easy to take.

Women having to buy glucometers and test strips for regular monitoring comes at a discomfort because of cost. So, sometimes we have to admit them for better control of blood sugar and it comes at a discomfort to them, it becomes challenging, and they start threatening to go home.

One of them added “If you want to put them on insulin, those without fridges struggle.” (# Gynaecologist)

“Long waiting queues at laboratories, when women are stressed they abscond.” (# Nutritionist/Dietician)

“Some of the main challenges faced include; financial challenges, emotional trauma and anxiety.

*The drugs are not easy to take*” (# Midwife)

**Issues Of Non-compliance And Reasons For Non-compliance**
The healthcare providers admitted that they experience issues of non-compliance.

“Yes, we experience issues of non-compliance. The reasons for non-compliance include; poverty, seasonal availability of fruits and vegetables, hormonal changes and lack of support from family members.” (# Nutritionist/Dietician)

“Yes, they are issues of non-compliance. Sometimes they throw medications away and eat all that you asked them not to eat and come to you with issues and the reason is that women sometimes become fed-up with treatment; sometimes what they are supposed to eat, they don’t like it.” (# Gynaecologist)

**Important Resources Required For The Effective Screening And Management Of The Gdm**

The healthcare providers listed the following as important resources required for effective screening and management of GDM; tools for screening especially test strips and dedicated staff

“Tools needed for screening need to be available; weight and height measuring devices, protein and glucose in urine dipsticks, glucose test strips and dedicated staff -those who would take their time take good medical history and do a thorough physical examination.” (# Gynaecologist)

**Gdm Knowledge: Guidelines, Prevention, Treatment And Consequences**

All the healthcare providers said they were national guidelines for screening women for GDM and that those guidelines were feasible. When all study participants were asked to share what they knew about GDM, on what it was, causes and preventions, only the obstetrician, midwife and the dietician were able to provide detailed information on what GDM was, its causes and what can be done to prevent it. GDM usually diagnosed after 20 weeks of gestation, second trimester of pregnancy. Reasons for delayed diagnosis includes; lack of equipment to perform test, ignorance, and delay in seeking care. Both the obstetrician and the nutritionist/dietician highlighted on the need for preconception care.

“Well, I don’t think that we can prevent it fully, perhaps if women practice what we call preconception care then they can take good care of themselves, optimize their health-put body mass index in good state before they start embarking on pregnancy but the genetic predisposition, you can’t take it away” (# Gynaecologist)

“GDM is caused by unhealthy diets, physiological changes especially hormonal changes, genetic factors, family history, physical inactivity during pregnancy and low patronage of preconception care. To prevent GDM, they should be increased patronage of preconception care, eat healthy diets and regularly screen for chronic conditions. There should be early nutrition care.”(# Nutritionist/Dietician)
How Gdm Affect Women

All the healthcare providers agreed that a delayed diagnosis of GDM can worsen the condition and it affects both the mother and the baby when it is delivered. The possible complications mentioned by all the healthcare providers were captured in the obstetrician’s response. Even though all the healthcare providers mentioned that a delayed diagnosis worsens the condition, there are still instances when women report to ANC very late or delay in seeking care.

“When diagnosis is delayed, there is the risk of developing complications, the women herself may have complications and the foetus may have complications. Woman may end up with all the diabetic complications we know of- hyperglycaemia, hypoglycaemia, ketoacidosis, coma, end organ damage (kidney, eyes, heart) and cardiomyopathy. For the foetus, overgrowing (macrosomic) or under growing (intra uterine growth restrictions), the baby can just die, the water around the bay can be too much (polyhydramnios)” (# Gynaecologist)

The midwife said “The condition would worsened because those who do not come for ANC, you won’t be able to get them. There are some situations where somebody will come to ANC at 32 or 34 weeks, if such a person is having GDM, you see that at that stage the situation would deteriorate and management becomes difficult” (# Midwife)

Dietary And Lifestyle Approaches Use For Managing Gestational Diabetes

Once GDM is diagnosed, dietician or nutritionist are involved. On the basis of dietary history and sometimes hormonal profiles a dietary regimen is prescribed. They include; healthy diets (DASH diet), my plate method and the 4-star diet. Pregnant women are also advised to avoid refined foods, engage in moderate exercise, encouraged to practice self-care behaviors, patronize preconception care and monitor blood glucose. When asked on national dietary guidelines for managing GDM, all the healthcare providers were not sure.

One of them offered “At the moment, Ghana uses the Canadian, U.S or U.K guidelines adapted to the Ghanaian setting.” (# Nutritionisit/Dietician)

She added “Shift from western diets to local foods, fruits and vegetables, physical activity and avoiding refined foods” (# Nutritionisit/Dietician)

However, one of the respondents was not very convinced on the effectiveness of dietary approaches for managing GDM. She said

“For the diet, it doesn’t do much but there is diet for them. Most at times they tell them not to eat starchy foods, sugar and others but eat more of vegetables and plant proteins” (# Midwife)
Alternative Approaches Recommended For The Management Of Gestational Diabetes

All the healthcare providers admitted that they are no alternative approaches they would recommend for the management of gestational diabetes. The healthcare providers were divided on whether religion/spirituality/tradition has a place in the management of GDM, as three of them believed it had no place in the management of GDM and the remainder felt otherwise.

One of them offered “Yes especially culture, it sometimes affects compliance to treatment. Spiritual believes are sometimes barriers to scientific treatment” (# Nurse)

Another added “Yes it’s there It was not GDM but three months ago there was case of rhesus incompatibility, then I told the women that since the husband is rhesus positive and she is negative she is supposed to take this antigen and the woman told me they have pray and fasted over it, so I should not worry” (# Midwife)

Gdm And Associated Factors Based On Experience

When all the healthcare providers were asked whether based on their experience, food security, diet intake and physical activity had any association with GDM, all of them admitted that diet intake and physical activity had some association with GDM, however one of them disagreed on the association between physical activity and GDM. All the HCPs, except one person, admitted that they could be a link between food security and GDM.

The one who disagreed offered “Well, looking at the pathophysiology, maybe I would rather say food security would be a problem with control after the woman has finally had GDM but I don’t think that would predispose someone to GDM. So if she has food security issues, she would not be able to adhere to dietary regimen” (# Gynaecologist)

When asked about depression, two of them out rightly said depression was not associated with GDM and the other two were not sure with one offering that diabetes predisposes people to depression and the saying “Some people when they are depressed, they tend to eat more but I am not sure” (# Nurse).

Main Themes For Hcps On Screening And Management

Two key themes for both screening experiences and management of GDM emerged after a reanalysis of the summary of responses based on the topics from the interview guide for HCPs. The themes for screening experiences were resource-related experiences and experience of patient emotional feedback. The two main themes for management were; 1 Diet and exercise; and 2 Oral medications. See Table 2 for summary of responses and themes from interview guide for HCPs.
Table 2
Summary of responses and themes from interview guide for experiences of HCPs on screening and management of GDM

<table>
<thead>
<tr>
<th>Themes from interview guide</th>
<th>Summary of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The screening process</strong></td>
<td>• ANC represents an important setup in screening for GDM</td>
</tr>
<tr>
<td></td>
<td>• ANC setups conduct screening test (urine and risk-factor based) and not diagnostic test</td>
</tr>
<tr>
<td></td>
<td>• On clinic days, screening is free</td>
</tr>
<tr>
<td></td>
<td>• Women are counselled before and after screening</td>
</tr>
<tr>
<td><strong>What happens after screening?</strong></td>
<td>• Positive cases are referred to Doctor or Nutritionist/Dietician</td>
</tr>
<tr>
<td></td>
<td>• Dietary counseling is based on diet history</td>
</tr>
<tr>
<td></td>
<td>• General nutrition talks and education at ANC</td>
</tr>
<tr>
<td><strong>Roles various HCP plays</strong></td>
<td>• Midwives are the engines of ANC</td>
</tr>
<tr>
<td></td>
<td>• Nutritionist/Dietician involved when nutrition-related issues are detected (eg GDM, Preeclampsia)</td>
</tr>
<tr>
<td></td>
<td>• Doctors consult pregnant women who come for ANC</td>
</tr>
<tr>
<td><strong>Roles various HCP plays</strong></td>
<td>• Useful for identifying clients at risk of GDM</td>
</tr>
<tr>
<td><strong>Challenges HCP’s faced when screening women for GDM</strong></td>
<td>• Non-compliance</td>
</tr>
<tr>
<td></td>
<td>• Financial constraints</td>
</tr>
<tr>
<td></td>
<td>• Inadequate resources</td>
</tr>
<tr>
<td><strong>Feelings/emotions/concerns of women and her family expressed after learning the GDM status</strong></td>
<td>• Women usually worried or shocked</td>
</tr>
<tr>
<td></td>
<td>• Unbothered because of lack of knowledge on GDM</td>
</tr>
<tr>
<td></td>
<td>• Worried for themselves and babies because of knowledge on GDM</td>
</tr>
<tr>
<td><strong>Treatment/Management women with GDM receive</strong></td>
<td>• Diet and exercise are first line of action</td>
</tr>
<tr>
<td></td>
<td>• Oral medications are last line of action</td>
</tr>
<tr>
<td>Themes from interview guide</td>
<td>Summary of responses</td>
</tr>
<tr>
<td>-----------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Challenges women face in the management of GDM and how it affect HCPs | • Long waiting queues  
• Inadequate support from family members  
• Financial challenges  
• Medications unpleasant |
| Reasons for non-compliance                                      | • Poverty  
• Seasonal availability of some fruits and vegetables  
• Hormonal changes  
• Inadequate support from family members  
• Being fed-up with dietary regimen or medications |
| Important resources required for the effective screening and management of the GDM | • Tools for screening  
• Dedicated personnel |
| Reasons for delayed diagnosis                                   | • Lack of equipment to run test  
• Ignorance  
• Delay in seeking care |
| How GDM affect women                                            | • Delayed diagnoses worsens condition  
• Women may end up with diabetic complications |
| Dietary and lifestyle approaches use for managing gestational diabetes | • Dash diet  
• My Plate Method  
• Four-star diet  
• Avoiding refined food  
• Clients encouraged to engage in self-care behaviors; exercise and preconception care |
| GDM and associated factors based on experience                  | • Diet and physical activity associated with GDM  
• Food security may be linked with GDM  
• Depression not associated with GDM |

**Discussion**

This study sort to explore the experiences of healthcare providers (HCPs) on screening and management of gestational diabetes. Two main themes emerged for both screening experience and management; the
screening experiences were resource-related experiences which comprised of financial constraints, lack/inadequate tools for screening, insufficient number of dedicated personnel and experiences with patient emotional feedback which included being worried, shocked or unbothered based on their knowledge of GDM, being fed-up with treatment and lack of support from family members; the themes for management were diet and exercise and oral medications. Generally, HCPs think that the most important resources required for the effective screening and management of GDM are the tools for screening and dedicated staff. The first line of action for GDM management is diet and exercise, oral medications are the last line of action and financial constraints remain a major issue when it comes to screening and management of GDM.

On screening experiences, specifically the resource-related experiences, we found that the ANC is an important setup in screening for GDM yet only screening test is performed and positive cases are referred to laboratories for further test. The free maternal health policy and the national health insurance have been essential for accessing health care, however, this does not cover test for GDM, specifically the oral glucose tolerance test which is recommended as confirmatory test by many of the criteria used in the diagnosis of GDM. This calls for measures to include GDM diagnosis in the list of item covered by the National Health Insurance Scheme particularly OGTT as a delay in diagnosis of the condition could worsen pregnant women's conditions. This kind of situation puts both the mother and the baby at risk. As indicated in this current study, a delayed diagnosis can expose the women to all the complications of diabetes; hypoglycaemia, ketoacidosis, coma, end organ damage (kidney, eyes, heart) and cardiomyopathy. The findings of the current study also indicates that a delayed diagnosis can affect the foetus in several ways including; overgrowing (macrosomic) or under growing (intra uterine growth restrictions), the baby can just die, the water around the baby can be too much (polyhydramnios). Some of the reasons stated for delayed diagnosis by HCPs were; lack of equipment to run test, ignorance and delay in seeking care, meanwhile, one of the phases in the “three delays” model is delay in deciding to seek medical care [13]. Also, lack of equipment, supplies and overcrowding at health facilities have been documented as challenges within the context of GDM screening and management [6]. Hence, there is the need for governments and other relevant stakeholders to regularly provide the tools and equipment needed to adequately screen and manage pregnant women who come for ANC.

Additionally, the HCPs admitted that screening is useful for identifying clients at risk of GDM. Despite all the aforementioned, HCPs still experience challenges when screening for GDM. In this study, the challenges HCPs faced when screening for GDM were summarized into three groups; non-compliance, financial constraints and inadequate resources. And some of the reasons that were cited for issues of non-compliance were poverty, seasonal availability of some fruits and vegetables, hormonal changes and inadequate support from family members.

The current study revealed instances where OGTT test were requested only for the pregnant women to bring it after two or three weeks later due to the cost involved, which has the potential to affect treatment as healthcare providers are not able to adequately track or monitor the blood glucose using internationally recommended standards. This further highlights the need to make OGTT more accessible...
to pregnant women and another way would be for the test to be covered by health insurance or for the government to subside the cost involved. This study also noted instances where some foods recommended for diet therapy were seasonal, thus threatening compliance of pregnant women to such dietary regimen, because when such foods go out of season, there would be the tendency to abandon the treatment plan.

A synergy of high cost of testing and seasonality availability foods for diet therapy coupled with inadequate staff or healthcare providers would create the atmosphere for non-compliance. Besides, this current study revealed that due to workload, follow-up is usually difficult. This indicates the need for more healthcare providers to be recruited into the healthcare delivery systems especially midwives and nutritionist or dieticians to diligently follow up on clients and possibly revise dietary regimen when peculiar foods are out of season.

Another reason noted for non-compliance was hormonal changes, this together with inadequate support from family members could hamper any chances of compliance. It is common knowledge that pregnancy comes with physiological and hormonal changes. Meanwhile, Brinker and colleague, established that social and emotional support were protective factors against depression [14], this underscores the psychological relevance of support from family members and relatives in managing health conditions, particularly those that are hormonal in nature. Hence, family member could be critical in helping pregnant women follow their dietary regimen in spite of hormonal changes. However, when family members do not provide the needed support, particularly financial and emotional support, it would further create the climate for non-compliance.

With regards to the second theme on screening experiences thus experience with patient emotional feedback, HCPs reported that the feelings expressed about women and their families after learning about GDM status was one of worry or shock. Other studies in the past have also reported feelings of shock when women found out about their diagnosis [15]. One of the HCPs went further to indicate that, the emotions expressed are mostly dependent on the pregnant women or clients understanding of GDM; those who knew about GDM were worried about themselves and the fetuses, those with little or no knowledge were not usually bothered or were uncertain about how they felt. A study in China also reported that some women were bothered after being diagnosed of GDM and others were not [16].

With regards to management, one of the themes that emerged was diet and exercise, the current study found that the first line of action when treating or managing GDM is usually diet and exercise and oral medications such as metformin and insulin are the last line of action to aid in blood sugar control. This is in line with the Norwegian guidelines for managing GDM [17]. Moholdt and colleagues also recommended a combination of diet and exercise as the first line of action [18]. Some of the dietary and lifestyle approaches use for managing gestational diabetes include DASH diet, My Plate Method, four-star diet and avoiding refined food. HCPs generally admonish pregnant women to engage in self-care behaviors especially to patronize preconception care and to monitor blood glucose regularly; self-care behaviors have been reported to improve quality of life [19].
With regards to the second theme on management of GDM, oral medications, this current study indicated that HCPs resorted to oral medications when they were not able to control blood sugar with diet and exercise. The commonest oral medication used was insulin as observed by the current study which is captured by Garrison's suggestion that pharmacologic therapy should be initiated with insulin, metformin or glyburide when blood sugar levels are still above target levels after glucose monitoring and lifestyle modifications [3]. Another study showed that physicians initially tried to lower blood sugar levels by using diet and exercise, and only used insulin when those methods failed [4]. In addition, the American Diabetes Association's standards of medical care in diabetes also recommends that when medical nutrition therapy, exercise, and glucose monitoring are not successful at controlling blood glucose level, insulin may be given as a last resort [5].

Finally, HCPs indicated that based on their experiences, diet intake and physical activity are associated with GDM. They also felt food security may have a link with GDM but one of them expressed pessimism and offered that food security may only be an issue when managing blood sugar levels after someone had developed GDM. However, the healthcare providers felt depression was not associated with GDM, studies in the past have demonstrated association between physical activity and GDM [20, 21] as well as diet intake and GDM [20–22]. Similarly, other studies in the past have also reported on association between food security and GDM [23, 24].

This study is not without limitation, for instance only five participants were interviewed, which could raise concerns about generalisability of our findings. This notwithstanding, we believe the key informants interviewed in this study adequately represent healthcare providers experiences considering that the ANC setups of secondary facilities are similar and the people interviewed were well versed with GDM screening and management in northern Ghana. Hence, we believe this study provides insights on healthcare providers’ experiences with screening and management of GDM which could be relevant for health advocacy and social and behavior change communication. It could also be relevant for health planning and policies as it provides insights on the resources needed to effectively screen and management GDM.

**Conclusion**

This study observed that ambivalence of clients, resource constraints namely financial constraints, lack/inadequate tools for screening and inadequate number of healthcare providers were key issues in the screening and management of Gestational Diabetes; diet and exercise, and oral medications were the main approaches for the management of Gestational Diabetes. This study provides insights on healthcare providers’ experiences with screening and management of GDM which could be relevant for health advocacy and social and behavior change communication. It could also be relevant for health planning and policies as it provides insights on the resources needed to effectively screen and management GDM.

**Abbreviations**
HCPs
Healthcare providers
HBA1c
Glycated haemoglobin
GDM
Gestational diabetes mellitus
ANC
Antenatal care
OGTT
Oral glucose tolerance test

Declarations

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Availability of data

The data supporting the findings of this study could be obtained from the corresponding author upon reasonable request

Authors' contributions

MB, AA, TH and FA conceptualized the study. AA, TH and FA supervised the study. MB, HM took part in the data acquisition. AA and MB took part in analyzing and interpreting the data. AA, FA, HM and HG reviewed it critically for important intellectual content. AA and MB wrote first draft of manuscript. MB was deeply involved in revising it for critical content. All authors read and approved the final manuscript.

Ethical approval and consent to participate

Permission to conduct this study was obtain from the School Public Health, the Tamale Metro health directorate, northern region health directorate as well as health facilities in which the study was conducted. Ethical clearance was obtained from the Navorongo Health Research Centre Institutional Review Board (NHRCIRB). Participants were recruited after signing an informed consent form. This study was conducted in line with the Helsinki Declaration.

Consent for publication
Not applicable

Competing interests

The authors declare they have no competing interest.

References


